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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/017,934	12/12/2001	Robert J. Small	M-11675 US	1435

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EXAMINER

UMEZ ERONINI, LYNETTE T

ART UNIT	PAPER NUMBER
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1765

DATE MAILED: 06/12/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/017,934

Applicant(s)

SMALL ET AL.

Examiner

Lynette T. Umez-Eronini

Art Unit

1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 1 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-6,8-18,20 and 21 is/are rejected.
- 7) ☒ Claim(s) 7,19,22 and 23 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

1. The reference Meilke et al. (US 5,439,551) was not correctly cited in the last Office action.
2. In response to applicant's inquiry on the citation of a reference is incorrect on June 6, 2003 regarding the last Office action, the following corrective action is taken.
3. The period for reply of one (to substantially equal the time remaining in the reply Period) MONTHS set in said Office Action is restarted to begin with the mailing date of this letter.
4. A corrected copy of the last Office Action is enclosed.

Claim Objections

- 5 Claims 4, 16, 22, and 23 are objected to because of the following informalities:

In claims 4 and 16, "2,4-pentadione" is misspelled. Appropriate correction is required. For the purpose of examination 2,4-pentanedione dioxime would be searched.

6. Claims 22 and 23 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in

Art Unit: 1765

independent form. Claims 22 and 23 are dependent upon a claim that does not exist and are withdrawn from consideration.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1-5, 8, 9, and 10 are rejected under 35 U.S.C. 102(b) as being anticipated by Small et al. (WO 98/04646).

Small teaches, "A composition for chemical mechanical polishing includes a slurry . . . a hydroxylamine compound, ammonium persulfate . . ." (Abstract)

and "The solution was composed of . . . hydroxylamine nitrate in . . . DI water. The pH was adjusted with small quantities of hydroxylamine, as the free base . . . Also used was an ammonium hydroxide solution . . ." (page 31 lines 9-18), which reads on,

A composition for chemical mechanical planarization comprising an aqueous oxidizer wherein said aqueous oxidizer comprises hydroxylamine and a material selected from the group consisting of hydroxylamine nitrate, ammonium salts, and mixtures thereof: **as in claim 1.**

Small teaches, "CMP of the copper metal can be done over a wide pH range (2 to 12" (page 5, line 13), "In acid solutions an inhibitor, i.e., benzotriazole

Art Unit: 1765

(BTA) is usually needed . . . in the CMP process (page 5, lines 15-17), which reads on,

a composition further comprising sufficient acid such that the pH of said composition is in the range from approximately 2.0 to approximately 5.0, **as in claim 10**; a material selected from the group said insoluble complexing agents, **in claim 2**; and said insoluble complexing agent is selected from the group consisting of benzotriazole, **in claim 3**;

Small teaches, "The polishing slurries consist of abrasive suspension (silica, alumina, etc.) usually in a water" (page 3, lines 16-18), which reads on, a composition further comprising an abrasive, **in claim 8** and said abrasive is selected from the group consisting of silica and alumina, **in claim 9**.

Small teaches, "It is possible to add chelating agents; i.e. alkyl beta-diketones (2,4, pentanedione, etc.) . . ." (page 12, lines 27-29), which reads on said dioxime is 2,4-pentanedione dioxime, **as in claim 4**.

Small teaches, "There are other additives that can be added to oxidizer that can also be used in the CMP process. The additive can include . . . citric acid" (page 19, lines 11-13), which read on a composition wherein in said soluble complexing agent is selected from the group consisting of citric acid, **as in claim 5**.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 1765

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Small (WO '646) as applied to claim 1 above, and further in view of Small et al. (US 5,981,454).

Small (WO '646) differs in failing to teach said free radical inhibitor is selected from the group consisting of hydrazine.

Small (US '454) teaches, "... a composition form chemical mechanical polishing of copper surface is an aqueous solution with a pH between about 3.5 and about 7. The composition contains ... a buffering amount of ... hydrazine or hydrazine salt base" (column 2, lines 37-45), which is the same as applicant's and which reads on said free radical inhibitor is selected from the group consisting of hydrazine.

It is well known in the art that a buffer is a solution that is used to maintain a constant pH. It is the examiner's position that it would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify Small (WO '646) by using Small's (US '454) hydrazine in a polishing composition for the purpose of buffering the polishing composition within a constant pH range (Small 'US 454, column 2, lines 41-45).

11. Claim 11-17, 20, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Small (WO '646) in view of Meikle et al. (US 5,439,551).

Art Unit: 1765

Small teaches, "A composition for chemical mechanical polishing includes a slurry . . . a hydroxylamine compound, ammonium persulfate . . ." (Abstract) and "The solution was composed of . . . hydroxylamine nitrate in . . . DI water. The pH was adjusted with small quantities of hydroxylamine, as the free base . . . Also used was an ammonium hydroxide solution . . . (page 31 lines 9-18), which reads on,

A composition for chemical mechanical planarization comprising an aqueous oxidizer wherein said aqueous oxidizer comprises hydroxylamine and hydroxylamine nitrate, **as in claim 11.**

Small differs in failing to specify a composition comprising 0.3 to approximately 10% hydroxylamine and 0.1% to 3% hydroxylamine nitrate, **in claim 11** and 12 % hydroxylamine sulfate, **in claim 12.**

Meikle teaches, "Example chemical-mechanical polishing process parameters include . . . slurry composition (column 3, lines 5-8), which provides evidence that the concentration of the polishing composition is a so-called "result effective variable."

It is the examiner's position that it would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify Small (WO '646) by varying the concentration of the polishing composition as taught by Meikle since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272,205 USPQ 215 (CCOA 1980).

Art Unit: 1765

Small further teaches, "CMP of the copper metal can be done over a wide pH range (2 to 12" (page 5, line 13), "In acid solutions an inhibitor, i.e., benzotriazole (BTA) is usually needed . . . in the CMP process (page 5, lines 15-17), which reads on,

a composition further comprising sufficient acid such that the pH of said composition is in the range from approximately 2.0 to approximately 5.0, **as in claim 13**; a material selected from the group said insoluble complexing agents, **in claim 14**; and said insoluble complexing agent is selected from the group consisting of benzotriazole, **in claim 15**;

Small teaches, "The polishing slurries consist of abrasive suspension (silica, alumina, etc.) usually in a water" (page 3, lines 16-18), which reads on, a composition further comprising an abrasive, **in claim 20** and said abrasive is selected from the group consisting of silica and alumina, **in claim 21**.

Small teaches, "It is possible to add chelating agents; i.e. alkyl beta-diketones (2,4, pentanedione, etc.) . . ." (page 12, lines 27-29), which reads on said dioxime is 2,4-pentanedione dioxime, **as in claim 16**.

Small teaches, "There are other additives that can be added to oxidizer that can also be used in the CMP process. The additive can include . . . citric acid" (page 19, lines 11-13), which read on a composition wherein in said soluble complexing agent is selected from the group consisting of citric acid, **as in claim 17**.

Art Unit: 1765

12. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Small (WO '646) in view of Meikle (US '551) as applied to claim 11 above, and further in view of Small (US '454).

Small (WO '646) in view of Meikle differs in failing to teach said free radical inhibitor is selected from the group consisting of hydrazine.

Small (US '454) teaches, "... a composition form chemical mechanical polishing of copper surface is an aqueous solution with a pH between about 3.5 and about 7. The composition contains ... a buffering amount of ... hydrazine or hydrazine salt base" (column 2, lines 37-45), which is the same as applicant's and which reads on said free radical inhibitor is selected from the group consisting of hydrazine.

It is well known in the art that a buffer is a solution that is used to maintain a constant pH. It is the examiner's position that it would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify Small (WO '646) in view of Meikle by using Small's (US '454) hydrazine in a polishing composition for the purpose of buffering the polishing composition within a constant pH range (Small 'US 454, column 2. line 41-45).

Allowable Subject Matter


13. Claims 7 and 19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Prior art fails to teach a cmp polishing composition that comprises 4-hydrazine benzoic acid.

Art Unit: 1765

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lynette T. Umez-Eronini whose telephone number is 703-306-9074. The examiner is normally unavailable on the First Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin Utech can be reached on 703-308-3836. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

ltue
June 9, 2003



ROBERT KUNEMUND
PRIMARY EXAMINER